Brucellosis:
The Bugs and The Disease

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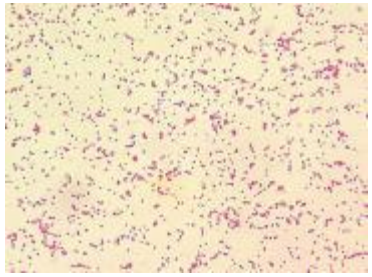
Workshop: An Integrated Approach to Controlling Brucellosis in Africa, Addis Ababa, 29-31 January 2013

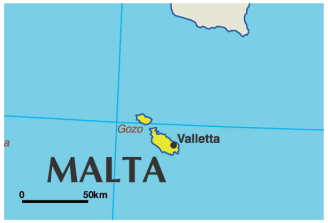
The “Star” of the Workshop

- Small, Gram-negative, non-motile
- Non-spore-forming
- Rod shaped coccobacilli
- Facultative & intracellular
- Causes chronic disease
- Recognized in humans since the 1850’s in the Crimea War



History and Nomenclature

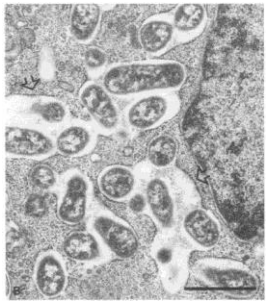
- Causal relationship between clinical disease and organism by Dr. David Bruce in 1887 = *Brucella*
- *Brucella abortus* isolated by Danish Veterinarian Bernhard Bang = Bang's disease
- Unpasteurized milk identified as source in 1905 by archeologist Themistocles Zammit from Malta (earned a knighthood) = Malta Fever



History and Nomenclature (continued)

- Undulant fever from the characteristic wave like fever (rises and falls)
- Lots of other names – usually including fever
  - Crimean, Cyprus, Goat, Neapolitan, Satan's
  - Fist of mercy, Scottish Delight, Jones Disease
- Neurobrucellosis identified in Saudi Arabia in 1989

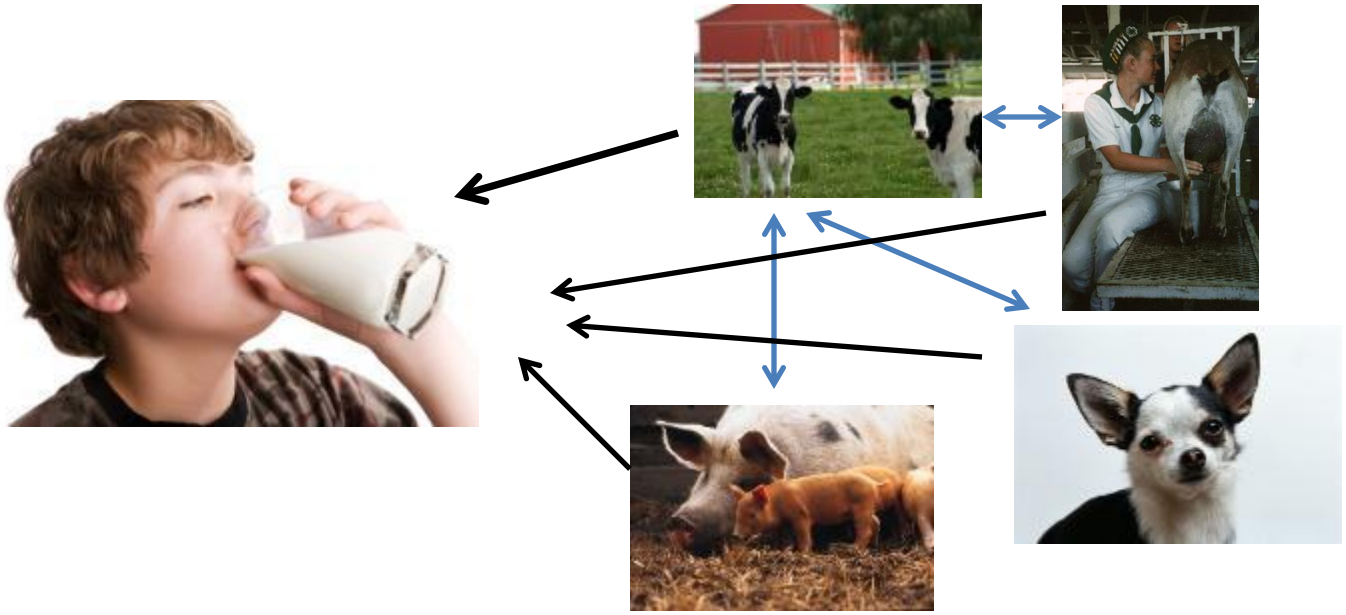
Brucella Species



- *B. abortus* – typically associated with cattle
- *B. melitensis* - typically associated with small ruminants (sheep and goats)
- *B. suis* - typically associated with pigs
- *B. ovis* -typically associated with sheep
- *B. canis*-typically associated with dogs
- *B. pinnipediae* & *B. ceti* - marine mammals
- *B. neotomai & B. microti* - rodents

Brucella is NOT species specific!

- Humans can be infected with any of the species listed before
- Not species specific and an individual can be infected with more than one species!



Clinical Disease in Animals

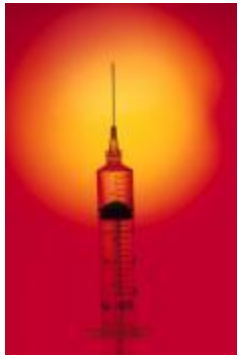
- In animals:
  - Primarily impact the reproductive organs
    - Abortions
    - Orchitis
    - Infertility
  - Can cause lameness in pigs
  - Typically no real apparent illness

Clinical Disease in Humans

- In humans:
  - Low mortality rate – but can be fatal
  - Severe chronic disease
    - Fever
    - Muscle pain
    - Joint pain and arthritis
    - Hepatitis
    - Neurological disorders
    - Endocarditis

Treatment

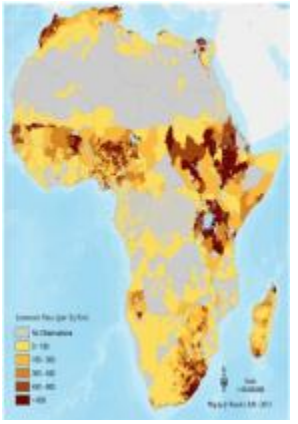
- Humans are treated with antibiotics
  - Long term and may not completely eliminate organism
  - Tetracyclines, rifampicin, aminoglycosides
- Not recommended to treat animals



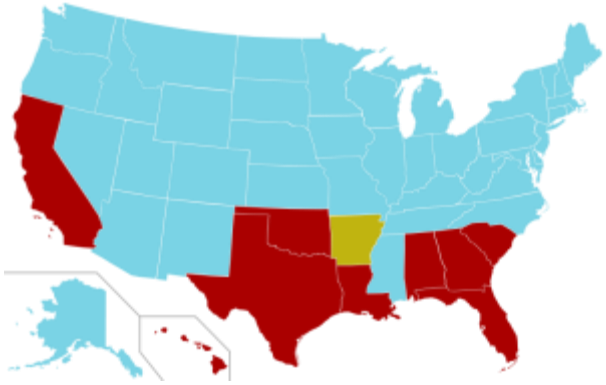
Prevention

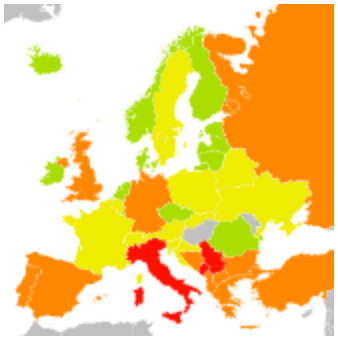
- In humans:
  - Controlling in animals – covered in the meeting
  - Milk pasteurization – including for cheese
  - Care in the lab-covered in the meeting
  - Care when handling aborted tissues or samples from animals suspected of being infected
    - Controlling aborted tissues – dogs, etc.
- In animals – will be discussed throughout workshop
  - Difficult – took more than 40 years in the US and still pockets in Greater Yellowstone area and feral pigs.

Other Concerns



- Brucella was weaponized in the 1950's
  - Determined not to be good on the battlefield
- Most common laboratory acquired infection
- Often underdiagnosed in the human population
- Remains a problem in much of the world





MUST CONTROL IN ANIMALS TO CONTROL DISEASE IN HUMANS!

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Conclusions

- Enjoy the workshop
- Interact with others
- Learn as much as possible
- Controlling brucellosis is important for human health in much of the world
- Ask questions

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